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Abstract

Three experiments were conducted to explore the credibility of earwitness versus eyewitness testimony among American college students. Experiment 1 demonstrated that subjects were less likely to identify the perpetrator of a simulated crime in auditory lineups than in visual or auditory-visual lineups. In Experiment 2, subjects observed a videotaped witness from Experiment 1 make an identification. Contrary to actual accuracy data, subjects were as believing of the identifications made by auditory witnesses as they were of the identifications made by visual or auditory-visual witnesses. In Experiment 3, mock jurors in a simulated robbery trial believed auditory lineup identifications as much as they did visual or auditory-visual lineup identifications.

A common procedure in criminal cases involving witnesses is to have the witness attempt to identify the perpetrator of the crime from a lineup. Although there has been a great deal of research on both eyewitness (Loftus, 1979; Yarmey, 1979) and earwitness identification (Bull & Clifford, 1984), only recently has research dealt with both the visual and auditory modalities in the same experiment. Only a few experiments address the very basic issue of which type of lineup (visual, auditory, or auditory-visual) is the most effective.

Hollien, Bennett, and Gelfer (1983) compared visual lineups with auditory lineups and found that visual lineups were superior in identifying a criminal suspect. In a replication and extension of Hollien et al. (1983), McAllister, Bregman, Dale, McCabe, and Cotton (1989) demonstrated that auditory-visual lineups produced no greater identification accuracy than a simple visual lineup, but both were superior to an auditory lineup. At odds with the two earlier experiments, Melara, DeWitt-Richards, and O'Brien (1989) found that target identification rates were highest in an auditory lineup and lowest in visual lineups with auditory-visual lineups falling in between. Thus, the question of which lineup modality produces the most accurate identifications has not yet been resolved.

Even more crucial than determining which type of witness is most accurate is which type of witness is the most believable. For example, would jurors be more influenced by the testimony of an eyewitness than an earwitness? Wells (1984) discussed four methods that could be used to examine the reactions to eyewitness testimony: (a) the questionnaire approach, (b) the prediction study, (c) the written or videotaped trail, and (d) the cross-examination of eyewitnesses to staged crimes. In light of the various strengths and weaknesses of each approach, Wells suggested that researches should not limit themselves to any one approach. If the various methods produced the same effect, the certainty about the effect would be increased. We used such a multi method

approach in the present research to explore the relative accuracy of eyewitnesses and earwitnesses.

The first approach involved a variation on the prediction study. According to Wells, the typical prediction study describes to subjects an actual eyewitness experiment and then asks them to predict the percentage of witnesses that were correct in their identifications. One potential wakens of this type of study, according to Wells, is that predictions may differ from the results of the actual experiment because of a poor description of the experiment. Further, subjects are asked to make summary judgments concerning the performance of a number of witnesses, as opposed to a judgment of a particular witness. Wells (1984) cited evidence that such estimates often produce quite different results. These weaknesses, however, do not have to be a part of research focusing on lineup procedures. Subjects could watch (on videotape) a witness reacting to the various members of the lineup and thus view exactly the same stimulus material as the witness. The only difference between the subject and the witness would be that the witness saw the perpetrator of the crime in the act, whereas the subject did not. Subjects' judgments about accuracy would be with respect to the viewed witness, as opposed to some abstract summary of witnesses.

Experiment 1

Experiment 1 was conducted to replicate the findings of McAllister et al. (1989). Contrary to their procedure, however, witnesses were limited to those who actually selected someone from the lineup. Although a case can be made for studying nonidentifications in which a witness claims that none of the lineup members are the perpetrators of the crime (e.g., McAllister & Bregman, 1986, 1989), the most typical situation for a case that will go to trial is one involving an identification.

Method

Subjects. Sixty-one men and 47 women from an introductory psychology class in the United States volunteered as subjects. They received course credit for participation. Only those who identified one of the lineup members were selected for analysis; there were 55 men and 31 women who made an identification.

Design. The design was a 2 × 3 (Sex of Subject × Lineup Modality: visual, auditory, or auditory-visual) factorial. Subjects were randomly assigned to one of the three lineup conditions.

Apparatus and materials. The visual and voice stimuli used in the original witnessing conditions and in the lineups were constructed from a pool of 48 "suspects," all White, male college students. We photographed each suspect outdoors against a brick wall background, and inside a large room against a blank, beige wall background. The outside photographs were full body, with the men wearing typical, casual clothing. The inside photographs were of their heads and shoulders with each suspect wearing the same white laboratory coat so that no other clothes were

visible in the photograph. All photographs were 9-mm × 13-mm color photographs. The man selected as the perpetrator for the simulated crime had the following characteristics: (a) clean-shaven, (b) no unusual physical characteristics, (c) no unusual voice characteristics, and (d) had given a convincing crime monologue reading. In a subsequent pilot study, five photographs of other suspects were selected based on the similarity of their inside photographs to the inside photograph of the perpetrator.

The voice stimuli used in the experiment were cassette tape recordings of a 60-s monologue by the perpetrator involving a conspiracy to commit murder and a 10-s recording in which some of the key lines from the original monologue were repeated. Every lineup member made one of the 10-s tapes for use in the voice lineups.

Procedure. Subjects were led to an experimental cubicle by the experimenter. Instructions were delivered via audio tape recordings. Subjects were given the outside picture of the perpetrator and told to examine it while listening to his voice. Following a 5-min filler task, subjects in the audio-visual lineup conditions were given a notebook containing 12 head-and-shoulders pictures, each on a separate page. They were told that they would be looking at a 12-person lineup, 1 person at a time, and that the person's voice would be presented as they examined his picture. Subjects were told that, just as in the real world, the perpetrator might or might not be in the lineup. When the experimenter rang a bell, subjects turned to examine the first picture while listening to the voice. After 10 s, the bell rang again and subjects recorded their judgment as to whether the person was the perpetrator, and how confident they were of their answer. This procedure was continued until six lineup members had been seen. Order was counterbalanced so that the perpetrator occurred equally often in each of the first six lineup positions. Following the sixth stimulus presentation, the experimenter explained that there would be no further stimuli to evaluate. This procedure of having the subjects believe that the lineup would involved 12 people while actually stopping at 6 was developed by Lindsay and Wells (1985) to reduce any tendency to increase the probability of making a "yes" response as the end of the lineup approached. The procedures for the other two lineup conditions were identical, except that no voices accompanied the pictures in the visual lineup condition and no pictures accompanied the voices in the auditory lineup condition.

Results

Only the data from those subjects selecting one of the members of the lineup were analyzed. A correct identification of the perpetrator was scored as 1, and incorrect identifications as 0.

Two planned comparisons were used to test for the effects found in McAllister et al. (1989). In the first comparison, the auditory-visual condition and the visual condition were combined and compared with the auditory condition. The comparison was significant $F(1, 80) = 4.15, p < .045$. The accuracy scores were higher in the visual condition ($M = .90$) and the auditory-visual condition ($M = .84$) than in the auditory condition ($M = .61$). The second comparison compared the auditory-visual condition with the visual condition. The comparison was not significant.

Neither of the contrasts interacted with sex of subject; however, there was a significant main effect of sex of subject $F(1, 80) = 6.47$, $p < .013$. The accuracy score for the women ($M = .94$) was superior to that of the men ($M = .71$).

Discussion

The results of Experiment 1 replicated the findings of McAllister et al. (1989). The accuracy of auditory-visual and visual lineups was superior to the accuracy of an auditory lineup, but not different from each other. These findings could now be the basis for a prediction study.

Experiment 2

Our main purpose in Experiment 2 was to determine whether subjects could predict the accuracy of witnesses in the various types of lineups used in Experiment 1. Past research has shown that subjects often believe the weakest of identifications (Loftus, 1974). The eyewitness-earwitness distinction, therefore, may not produce the differential effects in the prediction study.

Lindsay, Wells, and Rumpel (1981) demonstrated that jurors could discriminate among witnesses based on witnessing conditions, however, this discrimination could be made only when the eyewitness was relatively uncertain of his or her testimony. In light of this funding, we included witness confidence as an independent variable. When witness confidence is high, it might be that subjects do not perceive differences between eyewitnesses and earwitnesses. Differences may be found only when witness confidence is low. Finally, Experiment 2 explored the sex differences found in Experiment 1 by examining whether female witnesses would be believed more readily than their male counterparts.

Method

Subjects. A total of 144 and 144 women from an introductory psychology class volunteered as subjects. They received course credit for participation.

Design. The design was a 2 × 2 × 2 × 3 (Sex of Subject × Sex of Witness × Level of Witness Confidence: high or low) × Lineup Modality: visual, auditory, or auditory-visual) factorial. Subjects were randomly assigned to one of the combinations of sex of witness, confidence of witness, and lineup modality conditions.

Apparatus and materials. The visual and voice lineup stimuli were the same as those used in Experiment 1.

Procedure. Subjects were told that they would watch a videotape of an experiment in which a witness had seen and heard the perpetrator of a simulated crime and was then attempting to identify the perpetrator from a lineup. Following the tape, subjects were asked to evaluate the performance of the witness.

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Subjects then viewed the videotape in which the experimenter took either a male or a female witness (in reality, actors working for the experimenter) through the entire procedure of Experiment 1. Subjects watched as the witnesses were given their initial instructions. When the simulated crime was presented, the video screen and sound went blank in order to prevent the subjects in Experiment 2 from being witnesses themselves. When the video came back on, the witnesses were seen being taken through the lineup procedure of Experiment 1. As the witness was shown looking at (and/or listening to, depending on the experimental condition) each member of the lineup, the subject looked at and/or listened to the same stimulus material for the same amount of time. After the presentation of each lineup member, the subject watched the witness answer questions about that person. The responses were not visible on the monitor; rather, subjects saw the response sheet that the witness had supposedly filled out. In the high-confidence condition, subjects were shown responses in which the witness circled the scale point labeled *absolutely sure* for the lineup member that they had chosen, and either *absolutely sure* or *sure* for the five that they had rejected. In the low-confidence condition, witnesses circled the scale point labeled *not at all sure* for the lineup member that they had chosen and *not at all sure* or *not sure* for the five that they had rejected. The lineup member chosen by the witness was, in fact, randomly selected by the experimenter for each subject.

When the lineup procedure was completed, subjects were asked how confident they were that the lineup member chosen by the witness was actually the criminal. The 9-point scale was anchored on one end by *completely confident* and on the other by *not at all confident*. At this point subjects were debriefed.

Results

To determine whether subjects were able to intuit the accuracy of the witnesses in Experiment 1, we used the same two planned comparisons as in Experiment 1 to analyze the confidence-in-witness-accuracy measure collected in Experiment 2. In the first comparison, the two conditions involving visual cues during the lineup (the auditory-visual condition and the visual condition) were combined and compared with the auditory condition. Next, we compared the auditory-visual condition with the visual condition. Neither of the comparisons was significant.

Although we had predicted that the effect of lineup modality might appear only under conditions where the witness was not as confident, there was no significant interaction of either lineup modality contrast with the confidence manipulation. The only significant effect involving lineup modality was a comparison Target Sex × Witness Confidence interaction, $F(1, 264) = 4.59$, $p < .033$. Simple contrasts within each level of target sex and witness confidence revealed that the only condition under which the second comparison was significant was in the high-confidence condition with a female witness, $F(1, 264) = 6.82$, $P < .01$. In this condition, the subject had more confidence in the accuracy of the visual witness than in the accuracy of the audio-visual witness (see Table 1).

Table 1. Mean confidence in witness accuracy scores as a function of lineup modality, witness sex, and witness confidence in Experiment 2

Group	Auditory	Lineup modality Visual	Auditory-visual
Female witness			
High confidence	3.79	3.38	5.00
Low confidence	7.71	8.00	7.50
Male witness			
High confidence	4.04	4.13	3.83
Low confidence	7.63	7.33	7.50

Note: Confidence in witness accuracy scores ranges from 1 to 9, with lower scores indicating greater confidence.

The only other significant effect was a main effect for the confidence manipulation, $F(1, 264) = 200.62$, $p < .001$. Inspection of the means revealed that subjects were more confident in the identifications of highly confident witnesses ($M = 4.03$) than in those of unconfident witnesses ($M = 7.63$).

Discussion

Although Experiment 1 demonstrated that auditory identifications are less likely to be accurate than visual or auditory-visual lineups, subjects were just as believing of an auditory identification as they were of a visual or auditory-visual identification. We had predicted that, similar to the findings of Lindsay et al. (1981), subjects might be able to detect the accuracy differences among the lineups only when witnesses appeared unsure. Nevertheless, regardless of witness confidence level, there was no evidence of auditory witnesses being perceived as less accurate than visual witnesses.

Although these results are not encouraging concerning a juror's ability to appreciate the limitations of certain types of witness evidence, the results still may be a function of the limitations of this style of research: Subjects may not be as cautious in making judgments in a prediction study as actual jurors might be. Jurors are told that the defendant must be guilty beyond a reasonable doubt before they make a judgment of guilt; that instruction might make subjects more sensitive to any limitations in the witness's testimony.

Experiment 3

Our purpose in Experiment 3 was to determine whether subjects simulating the role of jurors would appreciate the limitations of the earwitness identifications found in Experiment 1. We presented to the subjects information about the lineup modality under which the identification was made, along with other information about the case. Subjects received one of four types of lineup information: (a) auditory, (b) visual, (c) auditory-visual, or (d) a no-lineup control. The control condition in which no identification was mad allowed an overall test of the influence of witness testimony. Because of the limited importance of the witness sex and witness confidence variables in Experiment 2, these variables were not included in Experiment 3.

Method

Subjects. A total of 100 men and women from an introductory psychology class volunteered as subjects. Subjects received course credit for participation.

Design. The design involved three lineup modality conditions: visual, auditory, and auditory-visual. There was also a control condition with no lineup or witness identification. Subjects were randomly assigned to one of the four conditions (25 subjects per condition).

Procedure. The experiment was conducted in group sessions. Subjects read a summary of a case that involved an armed robbery. We asked them to imagine themselves in the position of a juror presented with this evidence.

The case involved an armed robbery of a 27-year-old woman. The robber accosted the victim with a knife and demanded her money. The victim gave the robber her wallet, which contained $50, a driver's license, and four credit cards. A knife similar to the one used in the robbery was found in a trash can six blocks from the crime scene. The fingerprints found on the knife were smudged, so that it could not be determined whether they were the defendant's. Nevertheless, fingerprints found on the wallet did belong to the defendant.

Forty minutes after the incident, police arrested the defendant seven blocks away from the crime scene. The defendant matched the description given and was found to have $52 in cash and the victim's credit cards in his pocket.

The defendant, claiming innocence, said that he had been playing poker until only minutes before the police picked him up. The police later were able to locate a poker player who had been at the game; however, he was too drunk to know if the game had been going on at the time of the robbery or if the defendant had been a participant.

The victim was shown a lineup that included the defendant. For the subjects in the auditory-visual lineup condition, the victim claimed to clearly remember the criminal's face and voice. The lineup, therefore, was described as one in which the victim looked at each member of a six-person lineup as they repeated the words spoken by the robber. For subjects in the visual condition, the victim said she clearly remembered the criminal's face, so the lineup involved the victim looking at the six lineup members as they stood silently. For the subjects in the auditory condition, it was explained that the victim never saw the robber's face because he came up from behind her, but she clearly remembered his voice. In this "lineup," the victim was not looking at a lineup; rather, she was listening to six lineup members repeat the words spoken by the robber. In all three types of lineups, the victim identified the defendant. Finally, in the control condition, it was explained that the victim did not remember the criminal's face or voice because the robber had come up from behind her and she never saw his face or heard his voice. There was no lineup.

Subjects received the judge's instructions to the jury, which included the standard statements that the burden of proof was on the state and that all essential elements of the prosecution's case needed to be established beyond a reasonable doubt. Reasonable doubt was defined.

We asked the subjects to respond to two questions concerning defendant guilt: (a) How would you vote as a juror in this case (guilty or not guilty)? and (b) What is your perception of this defendant's guilt on an 11-point scale ranging from *completely certain of his guilt* to *completely certain of his innocence*? We also asked subjects how confident they were of the victim's ability to recognize the robber in the lineup; they responded using an 11-point scale ranging from *completely confident* to *not at all confident*.

Results

Two planned comparisons were used to test the effects found in Experiment 1 on the three dependent variables. In the first comparison, the two conditions involving visual cues during the lineup (the auditory-visual condition and the visual condition) were combined and compared with the auditory condition. This comparison was conducted on the three dependent measures: It was not significant on the vote measure, on the perception of guilt measure, or on the confidence of identification measure (see Table 2). The second comparison compared the auditory-visual condition with the visual condition. The second comparison was not significant on the vote measure, on the perception of guilt measure, or on the confidence of identification measure.

In a third comparison, the three conditions involving lineups (auditory-visual, visual, and auditory) were combined and compared with the control condition. The third comparison was significant for the vote measure, $F(1, 96) = 16.07$, $p < .001$, marginally significant on the perception of guilt measure, $F(1, 96) = 3.78$, $p < .055$, and significant on the confidence of identification measure, $F(1, 96) = 69.54$, $p < .001$. As can be seen from the means in Table 2, the lineup conditions produced a higher proportion of guilty votes, a greater perception of defendant guilt, and greater confidence that the victim could identify the perpetrator in a lineup.

Discussion

As in Experiment 2, subjects in Experiment 3 failed to appreciate the limitations of earwitness testimony. When the earwitness condition was compared with the two conditions involving vision, there were no significant effects. In fact, inspection of the votes revealed more guilty votes int he auditory condition than in any other condition. On the measures of perception of guilt and confidence in the witness's ability to recognize the robber, the auditory condition produced scores inferior to those in the visual conditions; however, the effects were far from significant. Thus, as in Experiment 2, earwitness testimony was as readily accepted as eyewitness testimony.

The impact of all three types of testimony was found in the comparison with the control. Comparisons with the control revealed that the conditions with a witness identification produced

Table 2. Mean guilt vote, perception of guilt, and confidence in identification as a function of lineup modality in Experiment 3

Modality	*n*	Measure		
		Vote	Perception	Confidence
Auditory	25	.84	4.00	4.44
Visual	25	.76	3.20	3.44
Auditory-Visual	25	.80	3.32	3.48
Control	25	.40	4.68	9.52

Note: Votes were scored as 1 for guilty and 0 for not guilty. Perception of guilt scores ranged from 1 to 11, with lower scores indicating higher perception of guilt. Confidence in identification scores ranged from 1 to 11, with lower scores indicating higher confidence in the identification.

greater numbers of guilty votes and perception of guilt. The addition of an eye/earwitness identification was quite dramatic, doubling the conviction rate of the case without such evidence.

General Discussion

Experiment 1 replicated the previous findings by McAllister et al. (1989) and Hollien et al. (1983) that earwitnesses are less accurate in identifications than eyewitnesses are. In Experiments 2 and 3, we sought to determine how well a juror might intuit the limitations of earwitness testimony. Using a modified prediction procedure, we found in Experiment 2 that subjects observing other subjects attempting to make an identification were not sensitive to differences in the lineup modality: They were as confident of the identification made in the auditory lineup as of those made in the visual and auditory-visual lineups. Experiment 3 conceptually replicated the results of Experiment 2, but employed a different methodology, a jury simulation. Auditory identifications produced the same level of guilty votes and perception of guilt as did the visual and auditory-visual identifications. A consistent pattern emerged from the two experiments—subjects did not appreciate the limitations of earwitness testimony.

We made various attempts to create conditions that would allow subjects to recognize earwitness limitations. Experiment 2 included a manipulation of witness confidence. Lindsay et al. (1981) found that when the witness was uncertain, subjects would take into account the witnessing conditions. Although the confidence manipulation considerably lowered the estimates of witness accuracy, it did not interact with lineup modality. By lowering the scores, the confidence manipulation also ruled out a ceiling effect as a possible cause for not finding differences between eyewitnesses and earwitnesses. It also was thought that the subjects might react differentially to auditory versus visual identifications in Experiment 3, when given the typical juror instructions that they must be convinced beyond a reasonable doubt before voting guilty. In spite of our attempts to produce differences, we found no differences. The failure of the subjects to appreciate the limitations of earwitnesses across the two different methodologies increases confidence that the effect is a general one.

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